[From the American Journ. of Science and Arts, Vol. XXXIII, March, 1862.]

ON THE COMPANION OF SIRIUS,

By Prof. G. P. BOND,
Director of the Observatory of Harvard College.

The companion of Sirius, discovered by Mr. Clark on the 31st of January, with his new achromatic object-glass of *eighteen and one-half* inches aperture, I have succeeded in observing with our refractor as follows:

Angle of position,	85° 15′	± 1°·1
Distance,	10″ 37	± 0″·2

The low altitude of Sirius in this latitude, even when on the meridian, makes it very difficult to catch sight of the companion, on account of atmospheric disturbances; when the images are tranquil, however, it is readily seen. It must be regarded as the best possible evidence of the superior quality of the great object-glass, that it has served to discover this minute star so close to the overpowering brilliancy of Sirius. A defect in the material or workmanship would be very sure to cause a dispersion of light which would be fatal to its visibility.

It remains to be seen whether this will prove to be the hitherto invisible body disturbing the motions of Sirius, the existence of which has long been surmised from the investigations of Bessel and Peters upon the irregularities of its proper motion in right ascension.

A discussion of the declinations of Sirius, establishing a complete confirmation of the results of Bessel and Peters, has been recently completed and published by Mr. Safford. The following passage is extracted from the last Annual Report of the President of Harvard College. Alluding to the operations at the Observatory, the Report gives, as the conclusion of this discussion, "an interesting confirmation of Bessel's hypothesis that the star revolves around an invisible companion in its near vicinity;—the period of revolution is about fifty years."

It will require one, or at the most, two years to prove the physical connection of the two stars as a binary system. For the present we know only that the *direction* of the companion from the primary accords perfectly with theory. Its faintness would lead us to attribute to it a much smaller mass than would suffice to account for the motions of Sirius, unless we suppose it to be an opaque body or only feebly self-luminous.

ON THE DISCOVERY OF THE ASTEROID (72).

COMMUNICATED BY PROF. G. P. BOND,
Director of Observatory of Harvard College.

In reducing the positions of the asteroid Maja, made at the Observatory of Harvard College in April and May last, Mr. T. H. Safford had occasion to refer to the observations made by Dr. Peters at the Observatory of Hamilton College, published in Brünnow's Astronomical Notices, No. 27, p. 20. The first three of these, namely, those for May 9, 11 and 12, were found to agree with the nearly cotemporaneous ones made here, but the remainder presented an unaccountable discrepancy.

A comparison with Mr. Hall's ephemeris of Maja, published in the Astronomische Nachrichten, No. 1315, showed that the Cambridge series entire, and the first three of the Hamilton College positions, belonged to Maja; but the remaining eight, from May 29th to June 13th, differed widely from the ephemeris. That the latter was not at fault, was proved by its accordance with all the Cambridge positions.

The systematic character of the differences, suggested, as a possible explanation, that Dr. Peters had, in the interval between May 12th and 29th, left the track of Maja, and fallen upon a new planet. Mr. Safford proceeded to verify this conjecture by computing from Dr. Peters' published observations of May 29th, June 7th and 13th, the following elements, which have a decidedly asteroidal character:—

1861. May 29·3851 Wash. m. t.

M	221° 24′ 45″·6
π	350 28 7 ·3
Ω	208 37 18 ·8
i	5 20 2 ·6
φ	8 21 49 ·8
μ	1253″·997

The observations, as printed, furnished only approximate positions, for want of accurate places of the comparison stars. The latter have since been supplied from the Harvard Zones. The elements representing the corrected places are as follows:—

Elements of Asteroid (72); by T. H. SAFFORD.

1861. May 29·375 M. T. Washington.

L	213° 3′ 24″·1	M. eq. 1861·0
π	329 22 16 ·5	
Ω	208 1 28 ·0	
i	5 23 16 ·2	
φ	6 50 26 ·0	
μ	1129″·372	
log. a	0·331446	

An ephemeris roughly computed from the above, shows the following agreement with observation.

	c.—o.			c.—o.	
	$\Delta\alpha$	$\Delta\delta$		$\Delta\alpha$	$\Delta\delta$
May 29,	+1″	0″	June 7,	+2″	0″
30,	−1	−2	8,	−1	−2
31,	−4	0	10,	+3	−3
June 1,	−4	0	13,	+1	0

which leaves no doubt that the object in question is a new asteroid accidentally fallen upon in searching for one discovered but a few weeks earlier. Its mean distance from the sun is the least of the known group.

ON THE DISCOVERY OF COMET III. 1861.

A telescopic comet was discovered at this Observatory by Mr. H. P. Tuttle, at 3 A. M., Dec. 29th. The following observations and elements have been obtained.

Observations of Comet 1861, III, *made at the Observatory of Harvard College, Cambridge, U. S.* [By a provisional reduction.]

	M. T. Cambridge.	A. R.	Dec.
1861, Dec.	28, $18^h\ 25^m\ 34^s$	$14^h\ 12^m\ 55^s{\cdot}3$	$-5°\ 12'\ 39''$
	30, 18 20 16	14 15 29 ·9	−1 24 42
1862, Jan.	1, 18 37 18	14 18 29 ·9	+3 9 31

The following elements have been computed by T. H. Safford, Assistant at the Observatory:—

T. 1861. Dec. 6·9867. M. T. Washington.
log. q, 9·92400
ω,* 331° 39′·10
☊, 146 8 ·78 App. equinox Jan. 1, 1862.
i, 41 58 ·40
Motion retrograde.

The middle observation is represented as follows:

	c.—o.
$\delta\lambda \cos \beta$,	+0′·19
$\delta\beta$,	+0 ·03

The subjoined ephemeris may perhaps be useful for the reduction of observations.

18^h Washington.	Comet's A. R.	Comet's Dec.	log. Δ
1862. Jan. 1,	214° 40′	+3° 8′	9·755
3,	215 39	8 36	9·714
5,	216 49	15 9	9·675
7,	218 19	22 59	9·638
9,	220 18	+32 3	9·609

About the 20th inst. it will approach the north pole.

Elements of Comet III, 1861; by H. P. TUTTLE.

Perihelion passage, Dec. 7·2024. M. T. Gr.
log. q 9·923922
π 173° 27′ 42″·7
☊ 145 7 59 ·4 M. eq. 1862·0
i 41 51 54 ·2
Motion retrograde.
From observations of Dec. 28th, Jan. 1st, 4th, and 7th.

* Distance of the perihelion from the ascending node in the direction of motion.

ON THE PHYSICAL ASPECT OF ENCKE'S COMET.

COMMUNICATED BY PROF. G. P. BOND,
Director of Observatory of Harvard College.

The physical phenomena which this comet has exhibited on several previous occasions, have been again repeated during its present apparition. At first it was quite destitute of any central condensation—more so in fact than is common with even the faintest telescopic comets. This is its usual aspect when far distant from the sun. It soon acquired greater consistency and even exhibited an almost sparkling nucleus. It was for some time visible to the naked eye, and showed a respectable tail 1° in length.

Its most interesting peculiarity was a very decided disposition of its nebulosity on the side towards the sun, constituting a faint tail, as it were, opposed to the normal direction. This was formed a long time before the true tail made its appearance. It is by no means a new feature, as it is mentioned in its preceding apparitions by Struve, Schwabe, Wichman and others. In 1848 and again in 1852 it was particularly evident. The fact of its repetition in so many instances gives a kind of individuality to this comet, distinguishing it from most bodies of its class, and is interesting from its associations with its otherwise very remarkable character.

G. P. BOND.

Observatory of Harvard College, Jan. 3d, 1862.